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09/940,763	08/27/2001	Mark David Heminger	TI-32924	5769

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EXAMINER	
BELLO, AGUSTIN	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 08/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/940,763	HEMINGER ET AL.	
	Examiner	Art Unit	
	Agustin Bello	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11-19* is/are allowed.

6)☒ Claim(s) *1-9,20-23 and 25-28* is/are rejected.

7)☒ Claim(s) *10 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/28/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-9, 20-23, and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wissinger (U.S. Patent No. 5,592,320).

Regarding claim 1, Wissinger teaches a method of aligning two optical wireless links (e.g. "LCT A" and "LCT B" in Figure 1), each optical wireless link having a light beam having a field of view (e.g. respective "TRANSMIT FOV" of "LCT A" and "LCT B" in Figure 1), comprising: sweeping the first light beam of the first optical wireless link through a first pre-defined pattern (column 2 lines 23-25), sweeping the second light beam of the second optical wireless link through a second pre-defined pattern (column 2 lines 29-31), wherein the first light beam transmits position data for the first light beam (column 2 lines 14-16) and the second light beam transmits position data (e.g. "code" of column 3 lines 48-51 indicating the "relative position" as described in column 4 line 30 of "LCT A" relative to "LCT B"); detecting the second light beam at the first optical wireless device (column 2 lines 31-34); transmitting on the first light beam the position data for the second light beam (column 2 lines 31-34, e.g. "code" of column 3 lines 48-51 denoting "beam position" of column 4 line 1, or "time since LCT A was hit" of column 4 lines 5-9); detecting the first light beam at the second optical wireless device (column 2 lines 25-26 and shown in Figure 1(b)); and transmitting on the second light beam, the

position data for the first light beam (column 2 lines 26-27, e.g. "code" of column 3 lines 48-51 indicating the "relative position" as described in column 4 line 30 of "LCT A" relative to "LCT B"). Wissinger differs from the claimed invention in that Wissinger fails to specifically teach that the second light beam transmits position data for the second light beam. However, Wissinger teaches an alternative embodiment wherein a first transmitter generates and modulates a signal indicative of the position of its scanning light beam onto its output beam, thereby providing position data for the first light beam (column 6 lines 49-52). Wissinger further teaches that both first and second optical wireless links perform the scanning operation (e.g. "each of the LCT transmitters" of column 3 lines 30-33, column 2 lines 11-14), thereby suggesting that the second optical wireless link is capable of the same functions as the first optical wireless link. Considering that "LCT A" and "LCT B" of Wissinger do not know each others positions at start-up (column 3 lines 28-29), one skilled in the art would clearly have recognized that it would have been beneficial to allow the second optical wireless link of Wissinger - like the first optical wireless link - to also modulate its output beam with a signal indicative of the position of its scanning light beam, thereby transmitting position data for the second light beam. One skilled in the art would have been motivated to do so in order to expedite acquisition (a need noted by Wissinger column 1 lines 39-47) and to further facilitate accurate tracking and alignment (column 6 lines 54-55). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to design the second optical wireless link like the first optical wireless link so that the second light beam transmits position data for the second light beam, thereby expediting acquisition and the accuracy of tracking and alignment.

Regarding claim 2, Wissinger teaches that said first and second pre-defined patterns are spiral patterns (column 4 lines 24-25 and column 5 lines 40-45).

Regarding claim 3, Wissinger teaches that the position data for the first and second light beams comprises x and y coordinates for the light beam position (e.g. "position code" comprising binary coded "horizontal" and "vertical" increments denoting each "beam position" column 3 line 53 – column 6 line 1; also "x-y scan pattern" of column 3 line 34).

Regarding claim 4, Wissinger differs from the claimed invention in that Wissinger fails to specifically teach that the position data for the first and second light beams comprises radius and angle coordinates for the light beam position. However, as noted by the applicant (Specification page 14 lines 24-26), it would have been apparent to one skilled in the art that other representations of position such as radius and angle could be used in place of position values X and Y. One skilled in the art would have been motivated to use radius and angle coordinates for the light beam position in order to provide distance and elevation coordinates useful in three dimensional environments such as the free-space environment of Wissinger. Therefore, it would have been obvious and apparent to one skilled in the art at the time the invention was made to represent the position data for the first and second light beams as radius and angle coordinates for the light beam position.

Regarding claim 5, Wissinger teaches that the position data for the first and second light beams comprises a time stamp (e.g. "code indicating time it was hit" of column 3 lines 48-52) from which a previous X and Y coordinate is calculated (column 3 lines 53 – column 4 line 20; column 5 lines 25-37).

Regarding claim 6, Wissinger teaches that the position data for the first and second light beams comprises values in a control packet in that Wissinger teaches that a "position code" (column 3 lines 54-55) is transmitted between the first and second wireless transceivers indicating each beam position (column 4 line 1). This code, upon receipt at the distant transceiver, is decoded and provides a pointer to command the gimbal of the transceiver unit to the position at which the remote receiver was hit (column 5 lines 25-37). As such, the "position code" transmitted between the wireless transceivers of Wissinger can be considered a control packet given the broadest reasonable interpretation since it acts to control the gimbal position at the transceiver at which it was received, and further since the "position code" takes the form of a short fixed-length section of data transmitted as a unit – the definition of a packet.

Regarding claim 7, Wissinger teaches that the transmitting step comprises modulating a light beam to convey information (e.g. "used to modulate" of column 2 lines 28-29 or "modulates" of column 2 lines 31-34).

Regarding claim 8, Wissinger teaches aligning the first light beam to the position data detected in the second light beam (column 4 lines 5-20; e.g. "decoding," "scan position," and command of the gimbal" of column 5 lines 25-37).

Regarding claim 9, Wissinger teaches the first light beam transmits a default value for position data for the second light beam prior to the step of detecting the second light beam at the first optical wireless device (e.g. "signal indicative of the position of the scanning beam or timing information" initiating "LCT B" to scan as described in column 6 lines 43-62). It is clear that in transmitting the "signal indicative of the position of the scanning beam or timing information" from the first transceiver to the second transceiver, the second transceiver

initializes its beam scan according to the "relative position" (column 4 line 30) indicated by the "signal indicative of the position of the scanning beam or timing information," thereby providing a default position value for the position data for the second light beam prior to detecting the second light beam at the first optical wireless device.

Regarding claim 20, Wissinger teaches a method of communicating between two data devices comprising: coupling a first data device (e.g. "HOST" inherently input to reference numeral 44 in Figure 2) to a first optical wireless link (reference numeral 10 in Figure 2); coupling a second data device to a second optical wireless link (inherent in that satellite to satellite communication is achieved column 1 lines 8-10); aligning the first and second optical wireless links (column 3 lines 6-10), the aligning step including: modulating a first light beam with first position information (column 2 lines 14-17) and sweeping the first light beam through a pre-defined acquisition pattern (column 2 lines 23-25), sweeping the second light beam through a pre-defined acquisition pattern (column 2 lines 29-31), detecting the second light beam at the first optical wireless device (column 2 lines 31-34), detecting the first light beam at the second optical wireless device (column 2 lines 25-27), echoing the first position information back to the first optical wireless device via the second light beam (column 6 lines 58-62); aligning the first light beam to a position indicated by the second echoing step (column 4 lines 5-10); and aligning the first light beam to a position indicated by the second echoing step (column 4 lines 5-10); and communicating data between the first and second data devices over the first and second light beams, subsequent to the aligning step (column 4 lines 17-20 and column 5 lines 50-53). Wissinger differs from the claimed invention in that Wissinger fails to specifically teach modulating a second light beam with second position information and echoing the second

position information back to the second optical wireless device via the first light beam. However, Wissinger teaches that both first and second optical wireless links perform the scanning operation (e.g. "each of the LCT transmitters" of column 3 lines 30-33, column 2 lines 11-14), thereby suggesting that the second optical wireless link is capable of the same functions as the first optical wireless link. Considering that "LCT A" and "LCT B" of Wissinger do not know each others positions at start-up (column 3 lines 28-29), one skilled in the art would clearly have recognized that it would have been beneficial to allow the second optical wireless link of Wissinger - like the first optical wireless link - to also modulate its output beam with a signal indicative of the position of its scanning light beam, thereby transmitting position data for the second light beam. Likewise, one skilled in the art would clearly have recognized that it would also have been beneficial to extend the echoing function to the first optical wireless link. One skilled in the art would have been motivated to do so in order to expedite acquisition (a need noted by Wissinger column 1 lines 39-47) and to further facilitate accurate tracking and alignment (column 6 lines 54-55). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to design the second optical wireless link like the first optical wireless link so that the second light beam transmits position data for the second light beam, thereby expediting acquisition and the accuracy of tracking and alignment.

Regarding claim 21, Wissinger teaches transmitting data from the first data device in an electrical format (e.g. "DATA FROM HOST" passed to "LASER MODULATOR" in Figure 2) and converting it to an optical format (e.g. via "LASER DIODE" 26 in Figure 2) prior to the communicating step (e.g. prior to transmission over free-space).

Regarding claim 22, Wissinger teaches sweeping the first and second light beams through a second pre-defined acquisition pattern (e.g. "fine tracking" of column 4 lines 35-38) after the steps of aligning the first light beam and aligning the second light beam, respectively.

Regarding claim 23, Wissinger teaches periodically sensing the position of the first light beam and the position of the second light beam and updating the first position information and second information, respectively (e.g. column 4 lines 21-34 or "pointing error information" of column 4 lines 18-20, 40-45).

Regarding claim 27, Wissinger teaches that at least one of said first and second optical wireless links is a modem in that each of the links modulates (column 4 lines 7-9) and demodulates (e.g. "decodes" of column 4 lines 5-7) the transmitted and received signals.

Regarding claim 28, Wissinger teaches that said pre-defined acquisition pattern is an overlapping spiral pattern (e.g. "decaying spiral scan" of column 4 lines 24-26).

3. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wissinger in view of Javitt (U.S. Patent No. 6,381,055).

Regarding claims 25 and 26, Wissinger differs from the claimed invention in that Wissinger fails to specifically teach at least one of the first and second data devices is a computer or network. However, the connection of computers or networks via free-space optical communication systems is well known in the art. Javitt, in the same field of free-space optical communication, teaches that it is well known in the art to connect a computer or a network to a free-space optical communication system such as that taught by Wissinger. One skilled in the art would have been motivated to do so in order to avoid the need for a hard-wired plant (column 1 lines 20-21 of Javitt). Furthermore, one skilled in the art would clearly have recognized that the

system of Wissinger would have been capable of facilitating free-space optical communication for a computer or network in that the system of Wissinger is clearly capable of receiving an electrical signal (reference numeral 44 in Figure 2) and uses this signal to modulate the optical output of laser thereby creating an free-space optical signal. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to connect either a computer or a network to the free-space optical communication system of Wissinger in order to facilitate free-space optical communication, thereby avoiding the need for a hard-wired plant.

Allowable Subject Matter

4. Claims 10 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter in claim 10: the prior art fails to teach or fully suggest that the position data for the first light beam is updated periodically at a first rate and wherein the position data is transmitted periodically at a faster rate. Wissinger teaches that a predetermined "dwell time" is necessary (column 4 lines 1-5), and that a scan rate (e.g. position data transmission rate) may need to be slowed in order to avoid a diverging process, thereby teaching away from transmitting position data at a rate faster than the position data is updated.

6. The following is a statement of reasons for the indication of allowable subject matter in claim 24: the prior art fails to teach or fully suggest that the first and second position information is transmitted periodically on said first and second light beams, respectively and the rate of transmission is greater than the rate at which the position information is updated.

Wissinger teaches that a predetermined "dwell time" is necessary (column 4 lines 1-5), and that a scan rate (e.g. position data transmission rate) may need to be slowed in order to avoid a diverging process, thereby teaching away from transmitting position data at a rate faster than the position data is updated.

7. Claims 11-19 are allowed.

8. The following is a statement of reasons for the indication of allowable subject matter: Claims 11-19 and claim 11 in particular recites an optical wireless link comprising: a light beam transmitter configured to transmit a first light beam; a light beam steering device, the light beam steering device configured to steer the light beam in a pre-defined pattern during an alignment acquisition phase; a light beam modulator, configured to modulate the first light beam with light beam position information, a photodetector configured to receive a second modulated light beam containing alignment feedback information, wherein the light beam steering device aligns the modulated light beam to a position indicated by the alignment feedback information, and wherein the light beam modulator is configured to modulate the first light beam with a portion of the alignment feedback information subsequent to the photodetector receiving the second modulated light beam. Wissinger and the prior art fail to teach or fully suggest that the light beam modulator is configured to modulate the first light beam with a portion of the alignment feedback information subsequent to the photodetector receiving the second. Although Wissinger teaches that an alignment feedback signal is received on a second modulated light beam (column 4 lines 5-7), Wissinger diverges from the claimed invention in the manner in which this feedback information is used. Wissinger teaches that the feedback signal on the second modulated light beam is used at the first optical wireless link to reset its scan position and further teaches that a

new feedback signal indicating the time at which the first wireless optical link was hit is modulated onto the first light beam to be used at the second optical wireless link to determine the alignment adjustments necessary at the second optical wireless device (column 4 lines 7-9). Wissinger fails to teach that a portion of the feedback signal on the second modulated light beam is used to modulate the first light beam and instead teaches that the feedback signal is sent to a pulse generator which generates a pulse enabling new clock or position data to be latched and later modulated onto the first light beam (column 5 lines 10-19).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Agustin Bello
Examiner
Art Unit 2633

AB